AMENDMENTS TO CLAIMS

1-18. (canceled)

5   19. (withdrawn): A mobile computing system comprising:

          a radio device;

          information storage; and

          a microprocessor programmed to cause said mobile computing system to
perform the steps of:

10   a) receiving, through said radio device, remote access request
frames transmitted from a remote mobile unit;

               b) following step a), determining if communication bandwidth is
available within said mobile computing system;

               c) retransmitting said remote access request frames in response to
15   determining that said communication bandwidth is available within said
mobile computing system;

               d) receiving, through said radio device, data frames with an
address of said mobile computing system in a path extending between
said remote mobile unit and an access point; and

20   e) transmitting said data frames received in step d) to a next
computing system along said path.

          20. (withdrawn): The mobile computing system of claim 19, additionally
comprising a display device, wherein

25   said microprocessor is additionally programmed to present a graphical
user interface causing controls to be presented on said display device and
accepting user inputs to set a first value, corresponding to a number of paths
between one or more remote mobile systems and one or more access points to
be accepted when a communications program is running within said mobile
30   computing system, and a second value, corresponding to a number of said

paths to be accepted when a communications program is not running within said mobile computing system, and to store said first and second values in said information storage, and

step b) includes comparing a present number of paths accepted by said mobile computing system with said first value stored in said information storage when a communications program is running within said mobile computing system and with said second value stored in said information storage when a communications program is not running within said mobile computing system.

21. (withdrawn): The mobile computing system of claim 19, wherein said microprocessor is additionally programmed to cause said mobile computing system to perform, following step d), the steps of:

f) determining if said data frames indicate that a present number of paths being used through said mobile computing system between one or more remote mobile systems and one or more access points has changed; and

g) changing a path number variable stored in said information storage in response to an indication in step f) that said number of paths has changed.

22. (withdrawn): The mobile computing system of claim 21, wherein step f) includes:

h) determining if said data frames are initially sent from a remote mobile system;

i) determining whether an address identifying said remote mobile system is stored in said information storage in response to a determination that said data frames are initially sent from a remote mobile system;

j) storing said address identifying said remote mobile system in said information storage and adding one to said path number variable in response to a determination that said address identifying said remote mobile system is not stored in said information storage.

23. (withdrawn): The mobile computing system of claim 22, wherein step f) additionally includes:

k) determining whether a termination tag is present in said data frames in response to a determination that said data frames are initially sent from a remote mobile system; and

l) deleting an address identifying said remote mobile system from said information storage and decreasing said path number variable by one in response to a determination that said termination tag is present in said data frames.

24. (withdrawn): The mobile computing system of claim 19, wherein said microprocessor is additionally programmed to cause said mobile computing system to perform, between steps d) and e), steps of:

determining that said data frames are initially sent by an access point;

determining if sufficient bandwidth is available within said mobile computing system;

adding a termination tag to said data frames in response to a determination that sufficient bandwidth is not available.

25. (withdrawn): The mobile computing system of claim 19, wherein step c) includes:

determining whether said mobile computing system is associated with an access point;

determining whether said radio device of said mobile computing system is within range to transmit data to said access point and to receive data from said access point;

transmitting said remote access request frames to said access point in response to a determination that said mobile computing system is associated with an access point, and additionally in response to a determination that said radio device is within range; and

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transmitting said remote access request frames without a destination address in response to determinations that said mobile computing system is not associated with an access point and that said radio device of said mobile computing system is not within range.

26. (withdrawn): An access point comprising:

a radio device;

a connection to a communications network;

information storage; and

a microprocessor programmed to cause said access point to perform steps of:

a) receiving remote access request frames through said radio device;

b) determining whether to grant remote association to a remote computing system initially transmitting said remote access request frames in response to receiving said remote access request frames,;

c) in response to determining to grant remote association to said remote computing system, storing addresses identifying one or more intermediate mobile units received with said remote access request frames in said information storage, generating remote response frames, adding said addresses to said remote response frames and transmitting said remote access response frames through said radio device.

27. (withdrawn): The access point of claim 26, wherein said microprocessor is additionally programmed to cause said access point to perform the following steps:

d) receiving first data frames from said communications network addressed to said remote computing system;

e) adding said addresses to said first data frames; and

f) transmitting said first data frames through said radio device.

28. (withdrawn): The access point of claim 27, wherein said microprocessor is additionally programmed to cause said access point to perform the following steps:

g) receiving second data frames through said radio device originally sent by said remote computing system;

h) deleting said address from said second data frames; and

i) sending said second data frames along said communications network.

29.-34. (canceled)

35. (withdrawn): A computer usable medium storing computer readable instructions, wherein said computer readable instructions loaded into a mobile computing system, including a radio device, information storage, a display unit, and a microprocessor, to execute a program which causes said mobile computing system to perform steps of:

a) receiving, through said radio device, remote access request frames transmitted from a remote mobile unit;

b) following step a), determining if communication bandwidth is available within said mobile computing system;

c) retransmitting said remote access request frames in response to determining that said communication bandwidth is available within said mobile computing system;

d) receiving, through said radio device, data frames with an address of said mobile computing system in a path extending between said remote mobile unit and an access point; and

e) transmitting said data frames received in step d) to a next computing system along said path.

36. (withdrawn): The computer usable medium of claim 35, wherein said

program additionally causes said mobile computing system to present a graphical user interface causing controls to be presented on said display device and accepting user inputs to set a first value, corresponding to a number of paths between one or more remote mobile systems and one or more access points to be accepted when a communications program is running within said mobile computing system, and a second value, corresponding to a number of said paths to be accepted when a communications program is not running within said mobile computing system, and to store said first and second values in said information storage, and

step b) includes comparing a present number of paths accepted by said mobile computing system with said first value stored in said information storage when a communications program is running within said mobile computing system and with said second value stored in said information storage when a communications program is not running within said mobile computing system.

37.   (withdrawn):   The computer usable medium of claim 35, wherein said program additionally causes said mobile computing system to perform, following step d), the steps of:

f)   determining if said data frames indicate that a present number of paths being used through said mobile computing system between one or more remote mobile systems and one or more access points has changed; and

g)   changing a path number variable stored in said information storage in response to an indication in step f) that said number of paths has changed.

38.   (withdrawn):   The computer usable medium of claim 37, wherein step f) includes:

h)   determining if said data frames are initially sent from a remote mobile system;

i)   determining whether an address identifying said remote mobile system is stored in said information storage in response to a determination that said data

frames are initially sent from a remote mobile system;

j) storing said address identifying said remote mobile system in said information storage and adding one to said path number variable in response to a determination that said address identifying said remote mobile system is not stored in said information storage.

39. (withdrawn): The computer usable medium of claim 38, wherein step f) additionally includes:

k) determining whether a termination tag is present in said data frames in response to a determination that said data frames are initially sent from a remote mobile system; and

l) deleting an address identifying said remote mobile system from said information storage and decreasing said path number variable by one in response to a determination that said termination tag is present in said data frames.

40. (withdrawn): The computer usable medium of claim 35, wherein said microprocessor is additionally programmed to cause said mobile computing system to perform, between steps d) and e), the steps of:

determining that said data frames are initially sent by an access point;

determining if sufficient bandwidth is available within said mobile computing system;

adding a termination tag to said data frames in response to a determination that sufficient bandwidth is not available.

41. (withdrawn): The computer usable medium of claim 35, wherein step c) includes:

determining whether said mobile computing system is associated with an access point;

determining whether said radio device of said mobile computing system is

within range to transmit data to said access point and to receive data from said access point;

transmitting said remote access request frames to said access point in response to a determination that said mobile computing system is associated with an access point, and additionally in response to a determination that said radio device is within range; and

transmitting said remote access request frames without a destination address in response to determinations that said mobile computing system is not associated with an access point and that said radio device of said mobile computing system is not within range.

42. (withdrawn): A computer usable medium storing computer readable instructions, wherein said computer readable instructions loaded into an access point, including a radio device, a connection to a communications network, information storage, and a microprocessor, which executes a program causing said access point to perform the steps of:

a) receiving remote access request frames through said radio device;

b) determining whether to grant remote association to a remote computing system initially transmitting said remote access request frames in response to receiving said remote access request frames;

c) in response to determining to grant remote association to said remote computing system, storing addresses identifying one or more intermediate mobile units received with said remote access request frames in said information storage, generating remote response frames, adding said addresses to said remote response frames and transmitting said remote access response frames through said radio device.

43. (withdrawn): The computer usable medium of claim 42, wherein said program additionally causes said access point to perform the following steps:

d) receiving first data frames from said communications network

addressed to said remote computing system;

      e) adding said addresses to said first data frames; and

      f) transmitting said first data frames through said radio device.

44. (withdrawn):   The computer usable medium of claim 43, wherein said program additionally causes said access point to perform the following steps:

      g) receiving second data frames through said radio device originally sent by said remote computing system;

      h) deleting said address from said second data frames; and

      i) sending said second data frames along said communications network.

45-50 (canceled)

51. (withdrawn): A computer data signal embodied in a carrier wave comprising computer readable instructions, wherein said computer readable instructions loaded into a mobile computing system, including a radio device, information storage, a display unit, and a microprocessor, to execute a program which causes said mobile computing system to perform the steps of:

      a) receiving, through said radio device, remote access request frames transmitted from a remote mobile unit;

      b) following step a), determining if communication bandwidth is available within said mobile computing system;

      c) retransmitting said remote access request frames in response to determining that said communication bandwidth is available within said mobile computing system;

      d) receiving, through said radio device, data frames with an address of said mobile computing system in a path extending between said remote mobile unit and an access point; and

      e) transmitting said data frames received in step d) to a next computing system along said path.

52. (withdrawn): The computer data signal of claim 51, wherein said program additionally causes said mobile computing system to present a graphical user interface causing controls to be presented on said display device and accepting user inputs to set a first value, corresponding to a number of paths between one or more remote mobile systems and one or more access points to be accepted when a communications program is running within said mobile computing system, and a second value, corresponding to a number of said paths to be accepted when a communications program is not running within said mobile computing system, and to store said first and second values in said information storage, and

step b) includes comparing a present number of paths accepted by said mobile computing system with said first value stored in said information storage when a communications program is running within said mobile computing system and with said second value stored in said information storage when a communications program is not running within said mobile computing system.

53. (withdrawn): The computer data signal of claim 51, wherein said program additionally causes said mobile computing system to perform, following step d), the steps of:

f) determining if said data frames indicate that a present number of paths being used through said mobile computing system between one or more remote mobile systems and one or more access points has changed; and

g) changing a path number variable stored in said information storage in response to an indication in step f) that said number of paths has changed.

54. (withdrawn): The computer data signal of claim 53, wherein step f) includes:

h) determining if said data frames are initially sent from a remote mobile system;

i) determining whether an address identifying said remote mobile system

is stored in said information storage in response to a determination that said data frames are initially sent from a remote mobile system;

j) storing said address identifying said remote mobile system in said information storage and adding one to said path number variable in response to a determination that said address identifying said remote mobile system is not stored in said information storage.

55. (withdrawn): The computer data signal of claim 54, wherein step f) additionally includes:

k) determining whether a termination tag is present in said data frames in response to a determination that said data frames are initially sent from a remote mobile system; and

l) deleting an address identifying said remote mobile system from said information storage and decreasing said path number variable by one in response to a determination that said termination tag is present in said data frames.

56. (withdrawn): The computer data signal of claim 51, wherein said microprocessor is additionally programmed to cause said mobile computing system to perform, between steps d) and e), the steps of:

determining that said data frames are initially sent by an access point;

determining if sufficient bandwidth is available within said mobile computing system;

adding a termination tag to said data frames in response to a determination that sufficient bandwidth is not available, .

57. (withdrawn): The computer data signal of claim 51, wherein step c) includes:

determining whether said mobile computing system is associated with an access point;

determining whether said radio device of said mobile computing system is

within range to transmit data to said access point and to receive data from said access point;

transmitting said remote access request frames to said access point in response to a determination that said mobile computing system is associated with an access point, and additionally in response to a determination that said radio device is within range; and

transmitting said remote access request frames without a destination address in response to determinations that said mobile computing system is not associated with an access point and that said radio device of said mobile computing system is not within range.

58. (withdrawn): A computer data signal embodied in a carrier wave comprising computer readable instructions, wherein said computer readable instructions loaded into an access point, including a radio device, a connection to a communications network, information storage, and a microprocessor, which executes a program causing said access point to perform the steps of:

a) receiving remote access request frames through said radio device;

b) determining whether to grant remote association to a remote computing system initially transmitting said remote access request frames in response to receiving said remote access request frames;

c) in response to determining to grant remote association to said remote computing system, storing addresses identifying one or more intermediate mobile units received with said remote access request frames in said information storage, generating remote response frames, adding said addresses to said remote response frames and transmitting said remote access response frames through said radio device.

59. (withdrawn): The computer data signal of claim 58, wherein said program additionally causes said access point to perform the following steps:

d) receiving first data frames from said communications network

addressed to said remote computing system;

 e) adding said addresses to said first data frames; and

 f) transmitting said first data frames through said radio device.

5 60. (withdrawn): The computer data signal of claim 59, wherein said program additionally causes said access point to perform the following steps:

 g) receiving second data frames through said radio device originally sent by said remote computing system;

 h) deleting said address from said second data frames; and

10 i) sending said second data frames along said communications network.

61. (new): A method for providing wireless data communication between an access point connected to a communication network and a remote mobile unit, out of range of direct wireless communication with said access point, wherein

15 said method comprises:

 a) transmitting a remote access request by radio from said remote mobile unit;

 b) generating path information describing said remote access request and a first plurality of paths from said remote mobile unit, wherein said first plurality of paths include a plurality of intermediate mobile units, in response to

20 said remote access request;

 c) transmitting said path information by radio;

 d) receiving path information describing said remote access request and a second plurality of paths, within said first plurality of paths, in said access point, wherein a portion of said path information is transmitted by radio to said access

25 point along each path in said second plurality of paths;

 e) transmitting a remote access response along each path in said second plurality of paths from said access point to said remote mobile unit;

 f) receiving said remote access response in said remote mobile unit,

30 transmitted along each path within a third plurality of paths, within said second

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plurality of paths; and

g) selecting a selected path within said second plurality of paths in said remote mobile unit.

h) sending data along said selected path between said remote mobile unit and said access point, wherein each said intermediate mobile unit in said selected path receives wirelessly transmitted data along said selected path in a first direction, and wherein each said intermediate mobile unit in said selected path transmits said data to continue in said first direction along said selected path.

62. (new): The method of claim 61, wherein step b) comprises:

receiving said remote access request in said plurality of intermediate mobile units; and

adding, in each intermediate mobile unit in said plurality of intermediate mobile units, to said remote access request, an address identifying said mobile unit as a part of a path to said remote mobile unit.

63. (new): The method of claim 62, wherein said plurality of intermediate mobile units includes:

a first plurality of intermediate mobile units directly receiving the remote access request from the remote mobile unit; and

a second plurality of intermediate mobile units receiving said remote access request transmitted by an intermediate mobile unit within said first plurality of intermediate mobile units.

64. (new): The method of claim 61, wherein said plurality of intermediate mobile units includes:

a first plurality of intermediate mobile units directly receiving the remote access request from the remote mobile unit; and

a second plurality of intermediate mobile units receiving said remote

access request transmitted by an intermediate mobile unit within said first plurality of intermediate mobile units.

65. (new): The method of claim 61, wherein

said path information received by said access point in step d) for each path in said second plurality of paths includes address information identifying each of said intermediate mobile units in said path, and

said remote access information transmitted along each path in said second plurality of paths in step e) includes address information identifying each of said intermediate mobile units in said path.

66. (new): The method of claim 61, wherein said path selected in step g) is a path along which said remote access response first received by said remote mobile unit has been transmitted.

67. (new): The method of claim 61, wherein said path selected in step g) is a path including a smallest number of intermediate mobile units.

68. (new): The method of claim 61, wherein

certain intermediate mobile units in said plurality of intermediate mobile units are associated with said access point, and

each of said intermediate mobile units in said plurality of intermediate units associated with said access point transmits said path information by radio directly to said access point.

69. (new): The method of claim 61, wherein step a) is preceded by determining that said remote mobile unit is out of range of direct wireless communication with said access point.

70. (new): The method of claim 61, wherein

said remote mobile unit stores information describing at least one path within said third plurality of paths in addition to information describing said selected path;

5   said remote mobile unit connects to said access point through one of said at least one path during step h) in response to a determination that transmitted data has not been received correctly.

71. (new): A system for providing a wireless connection to a communication

10   network in a remote location, wherein said system comprises:

a remote mobile unit at said remote location, wherein said remote mobile unit includes a radio transmitter and receiver and a microprocessor programmed to transmit a remote access request by radio in response to determining that an access point connected to said communication network is out of range for direct

15   radio communication with said remote mobile unit, to receive a remote access response transmitted along each path within a plurality of paths, to select a selected path from said plurality of paths, and to transmit and receive data along said selected path to said access point;

a plurality of intermediate mobile units, wherein each mobile unit in said

20   plurality of mobile units includes a radio transmitter and receiver and a microprocessor programmed to receive said remote access request, to add address information identifying said mobile unit to said remote access request, forming path information describing a path between said remote mobile unit and said intermediate mobile unit, to transmit said path information by radio, and to

25   receive and retransmit data including address information identifying said intermediate mobile unit when said data transmitted along a path between said remote mobile unit and an access point; and

an access point connected to said communication network, wherein said access point includes a radio transmitter and receiver and a microprocessor

30   programmed to receive said path information transmitted along each path within

a plurality of paths, to transmit a remote access response along each path within said plurality of paths, and to direct communications between said communication network and said remote mobile unit over said selected path.

5   72. (new): The system of claim 71, wherein said plurality of intermediate mobile units includes:

a first plurality of intermediate mobile units directly receiving the remote access request from the remote mobile unit; and

a second plurality of intermediate mobile units receiving said remote
10   access request transmitted by an intermediate mobile unit within said first plurality of intermediate mobile units.

73. (new): The system of claim 71, wherein

certain intermediate mobile units in said plurality of intermediate mobile
15   units are associated with said access point, and

each of said intermediate mobile units in said plurality of intermediate units associated with said access point transmits said path information by radio directly to said access point.

20   74. (new): The system of claim 71, wherein said path selected in step g) is a path along which said remote access response first received by said remote mobile unit has been transmitted.

75. (new): The system of claim 71, wherein said path selected in step g) is a
25   path including a smallest number of intermediate mobile units.

76. (new): The system of claim 71, wherein

said remote mobile unit stores information describing at least one path within said third plurality of paths in addition to information describing said
30   selected path;

said remote mobile unit connects to said access point through one of said at least one path during step h) in response to a determination that transmitted data has not been received correctly.

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